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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/824,577	04/14/2004	Chia-Chen Liu	252011-2230	6533

47390 7590 03/28/2006

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EXAMINER	
PERKINS, PAMELA E	
ART UNIT	**PAPER NUMBER**
2822	

DATE MAILED: 03/28/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/824,577	LIU ET AL.	
	Examiner	Art Unit	
	Pamela E. Perkins	2822	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *26 December 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-19,26 and 27* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-19,26 and 27* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *14 April 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *4/14/04*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

This office action is in response to the filing of the election on 26 December 2005. Claims 1-19, 26 and 27 are pending; claims 20-25 have been cancelled.

Election/Restrictions

Applicant's election without traverse of group I, claims 1-19 in the reply filed on 26 December 2005 is acknowledged.

Claims 20-25 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected group II, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on 26 December 2005.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-19, 26 and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Johnson (6,525,953) in view of Chakrabarti et al. (5,747,135).

Referring to claims 1, 14, 26 and 27, Johnson discloses a method of fabricating a semiconductor memory device where a first conductive layer (114), a first type doped semiconductor layer (130), a first dielectric layer (131), and a second type doped

semiconductor layer (132) are sequentially formed on a substrate (100); patterning the second type doped semiconductor layer (132), the first dielectric layer (131), the first type doped semiconductor layer (130), and the conductive layer (114) along the first direction, thereby turning the conductive layer into a first conductive line; patterning the second type doped semiconductor layer (132), the first dielectric layer (131), and the first type doped semiconductor layer (130) into a memory cell; depositing a second dielectric layer (not shown) overlying the substrate (100); planarizing the second dielectric layer to expose the memory cell; and forming a second conductive line (123) overlying the second dielectric layer, running generally perpendicular to the first conductive line (Fig. 7; col. 8, line 36 thru col. 9, line 22; col. 11, lines 18-43).

Johnson does not disclose employing oxygen plasma sputtering to clean the substrate before deposition of a second dielectric layer.

Chakrabarti et al. disclose a method of fabricating a semiconductor memory device where a dielectric layer (16) is formed over a substrate (12), wherein oxygen plasma sputtering is employed to clean the substrate before deposition of the dielectric layer (col. 3, lines 21-37).

Since Johnson and Chakrabarti et al. are both from the same field of endeavor, a method of fabricating a semiconductor memory device, the purpose disclosed by Chakrabarti et al. would have been recognized in the pertinent art of Johnson. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Johnson by employing oxygen plasma sputtering to clean

the substrate before deposition of a dielectric layer as taught by Chakrabarti et al. to contaminants form the substrate (col. 3, lines 37-43).

Referring to claim 2 and 14, Johnson discloses the first type doped semiconductor layer as a p+ -type doped silicon layer (col. 11, lines 18-43).

Referring to claims 3 and 14, Johnson discloses the first conductive layer comprising a stack of TiN/TiSi2/p+-type doped silicon layers (col. 8, lines 45-53).

Referring to claims 4 and 14, Johnson discloses the first conductive line as a word line (Fig. 1; col. 4, lines 60-63).

Referring to claims 5 and 15, Johnson discloses the formation of the first dielectric layer comprises rapid thermal oxidation of silicon (col. 8, lines 61-67).

Referring to claims 6 and 14, Johnson discloses the second type doped silicon layer is n-type doped silicon layer (col. 11, lines 18-43).

Referring to claims 7 and 14, Johnson discloses the memory cell comprises a stack of p+-type doped silicon/first dielectric/n-type doped silicon layers (Fig. 7; col. 11, lines 18-43).

Referring to claims 12 and 14, Johnson discloses the second conductive layer comprises a stack of n+-type doped silicon/TiN/TiS_2/n+-type doped silicon/n-type doped silicon layers (Fig. 7; col. 11, lines 18-43).

Referring to claim s13 and 14, Johnson disclose the second conductive line as a bit line (Fig. 1; col. 4, lines 60-63).

Referring to claims 8-11 and 16-19, Chakrabarti et al. do not disclose a flow rate between 200 and 400sccm, a temperature between 225 and 275 ^{O}C and power between 1000 and 1500W. It would have been obvious to one having ordinary skill in the art at the time invention was made to perform oxygen plasma cleaning at a flow rate between 200 and 400sccm, a temperature between 225 and 275 ^{O}C and power between 1000 and 1500W disclosed in the claimed invention, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233 (CCPA 1955).

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Lung et al. (6,984,548) disclose a three-dimensional memory array.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Pamela E. Perkins whose telephone number is (571) 272-1840. The examiner can normally be reached on Monday thru Friday, 8:30am to 5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Zandra Smith can be reached on (571) 272-2429. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

PEP

Zandra V. Smith
Supervisory Patent Examiner
20 March 2006